an optical transmission system that supplies residual pump light of an EDFA to an optical transmission line to cause Raman amplification, in which a pumping source of an EDFA is intensity modulated in accordance with a supervisory signal, Deguchi et al. does not teach or suggest wherein "said supervisory signal is superimposed on at least one of said plurality of pumping lights of different wavelengths," as recited in independent claims 1, 8 and 15, as amended, which is also missing from Heindmann and Suyama, as stated above.

Regarding Emori et al., it is respectfully submitted that although this document illustrates that a gain wavelength characteristic of Raman amplification is flattened by the use of a plurality of pumping lights of different oscillation center wavelengths, Emori et al. does not teach or suggest wherein "said supervisory signal is superimposed on at least one of said plurality of pumping lights of different wavelengths," as recited in independent claims 1, 8 and 15, as amended, which is also missing from each of Heindmann, Suyama and Deguchi et al., as stated above.

Finally, it is respectfully submitted that although Walker illustrates various kinds of optical amplifiers and WDM transmission systems including EDFA and a Raman amplifier, Walker does not teach or suggest wherein "said supervisory signal is superimposed on at least one of said plurality of pumping lights of different wavelengths," as recited in independent claims 1, 8 and 15, as amended, which is also missing from each of Heindmann, Suyama, Deguchi et al. and Emori et al., as stated above.

To establish a *prima facie* case of obviousness, three basic criteria articulated in MPEP §2142 must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all of the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Applicant's disclosure." In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). See also MPEP section 2142 (Establishing a prima facie case of obviousness).

Accordingly, it is respectfully pointed out that a *prima facie* case has not been established since each of prongs has not been met. More specifically, the second and third prongs for the test to establish a *prima facie* case of obviousness have not been met since each of Heindmann, Suyama, Deguchi et al. and Emori et al. separately, or combined do not teach

each of the features recited in independent claims 1, 8 and 15, as amended. Thus, even of one of ordinary skill in the art would have been motivated to combine these references, the this hypothetical combination does not teach or suggest the combination of features or operations recited in independent claims 1, 8 and 15, as pointed out above. Accordingly, withdrawal of this rejection and allowance of these claims are earnestly solicited. Further, for at least the reason that claims 3-7 depend from allowable independent claim 1, claims 10-14 depend from allowable independent claim 8, and claims 17-18 depend from allowable independent claim 15, it is respectfully submitted that these claims are also in condition for allowance.

Claims 1-18 were rejected under 35 USC 103(a)as being unpatentable over Heidemann ('306), or Suyama ('213), or Deguchi et al. ('721), when taken with Emori et al. (OFC '99) or Walker (OSA), when taken with Emori et al. (OECC) or Grubb et al. ('922). This rejection is respectfully traversed for the reasons stated below.

As pointed out above regarding the rejection of claims 1, 8 and 15, none of Heidemann ('306), Suyama ('213), Deguchi et al. ('721), Emori et al. (OFC '99) or Walker (OSA) teach or suggest "wherein "said supervisory signal is superimposed on at least one of said plurality of pumping lights of different wavelengths," as recited in independent claims 1, 8 and 15, as amended. Further, since Emori et al (OECC) and Grubb et al. are relied upon for the limited purpose of providing the use of plural pump wavelengths to pump Raman amplifiers operating in WDM modes, and do not teach or suggest "wherein when a plurality of pumping lights of different wavelengths are supplied to said Raman amplification medium, said supervisory signal is superimposed on at least one of said plurality of pumping lights of different wavelengths," as recited in independent claims 1, 8 and 15, as amended, which is also missing from each of Heidemann ('306), Suyama ('213), Deguchi et al. ('721), Emori et al. (OFC '99) and Walker (OSA), a *prima facie* case of obviousness have not been established, and each of independent claims 1, 8 and 15 are allowable over each of the references above, separately, or in combination thereof. See above for establishing a *prima facie* case of obviousness.

In view of the above points made by applicants, withdrawal of this rejection and allowance of each of independent claims 1, 8 and 15, and claims 3-7, 10-14 and 17-18, which depend therefrom, are earnestly solicited.

New Claim

It is respectfully submitted that new claim 19 is allowable for at least the reason that none

of the applied references teach or suggest "supplying a plurality of pumping lights of different wavelengths to a Raman amplification medium existing on the optical transmission path to Raman amplify the wavelength division multiplexed signal light propagating through the Raman amplification medium; and superimposing a supervisory signal on at least one of said plurality of pumping lights."

CONCLUSION

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

STAAS & HALSEY LLP

Date: May 27, 2003

By: _____

Patrick J. Stanzione
Registration No. 40,434

700 Eleventh Street, NW, Suite 500
Washington, D.C. 20001
(202) 434-1500

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Please AMEND the following claims:

1. (ONCE AMENDED) An optical transmission method, using Raman amplification [for transmitting] to transmit a wavelength division multiplexed signal light including a plurality of optical signals of different wavelengths among a plurality of optical transmission apparatuses and supplying a pumping light to a Raman amplification medium existing on an optical transmission path, to Raman amplify the wavelength division multiplexed signal light being propagated through the Raman amplification medium,

wherein a supervisory signal transferred among said plurality of optical transmission apparatuses is selectively superimposed on the pumping light supplied to said Raman amplification medium, and

wherein when a plurality of pumping lights of different wavelengths are supplied to said Raman amplification medium, said supervisory signal is selectively superimposed on at least one of said plurality of pumping lights of different wavelengths.

3. (ONCE AMENDED) An optical transmission method using Raman amplification according to claim [2] 1, wherein the pumping light to be superimposed with said supervisory signal is selected out of said plurality of pumping lights based on loss wavelength characteristics of said optical transmission path.

5. (ONCE AMENDED) An optical transmission method using Raman amplification according to claim [2] 1, wherein a part of the Raman amplified wavelength division multiplexed signal light input to said optical transmission apparatus through said optical transmission path is led to an optical filter having a passing band in a Raman gain band corresponding to a wavelength of the pumping light superimposed with said the supervisory, signal, to detect said supervisory signal using a light passing through said optical filter.

6. (ONCE AMENDED) An optical transmission method using Raman amplification according to claim [2] 1, wherein the supervisory signal transmitted from a previous stage optical transmission apparatus is detected to superimpose a suppression signal to suppress said detected supervisory signal on the pumping light corresponding to the pumping light

superimposed with the supervisory signal from said previous stage optical transmission apparatus, among the pumping lights of different wavelengths to be supplied to said Raman amplification medium.

8. (ONCE AMENDED) An optical transmission system using Raman amplification comprising:

a plurality of optical transmission apparatuses [for transmitting] to transmit a wavelength division multiplexed signal light including a plurality of optical signals of different wavelengths, and

a Raman amplifier [for] to Raman [amplifying] amplify the wavelength division multiplexed signal light being propagated through a Raman amplification medium by supplying a pumping light to said Raman amplification medium existing on an optical transmission path,

wherein said Raman amplifier includes a supervisory signal superimposing section [for superimposing] to selectively superimpose a supervisory signal transferred among said plurality of optical transmission apparatuses on the pumping light supplied to said Raman amplification medium,

wherein said Raman amplifier has a plurality of pumping light sources generating a plurality of pumping lights of different wavelengths, and

wherein said supervisory signal superimposing section selectively superimposes said supervisory signal on at least one of said plurality of pumping lights of different wavelengths supplied to said Raman amplification medium from said respective pumping light sources.

10. (ONCE AMENDED) An optical transmission system using Raman amplification according to claim [9] 8, wherein said supervisory signal superimposing section selects the pumping light to be superimposed with said supervisory signal is selected out of said plurality of pumping lights based on loss wavelength characteristics of said optical transmission path.

12. (ONCE AMENDED) An optical transmission system using Raman amplification according to claim [9] 8, wherein said optical transmission apparatus has an optical coupler for branching a part of the Raman amplified wavelength division multiplexed signal light sent from said optical transmission path, an optical filter input with a branched light from said optical coupler and having a passing band in a Raman gain band corresponding to a wavelength of the pumping light superimposed with said the supervisory signal, and a supervisory signal detecting

section for detecting said supervisory signal using a light passing through said optical filter.

13. (ONCE AMENDED) An optical transmission system using Raman amplification according to claim [9] 8, wherein when a plurality of said Raman amplifier are provided corresponding to respective repeating areas among said plurality of optical transmission apparatuses, said each Raman amplifier includes a suppression signal superimposing section for superimposing a suppression signal to suppress the supervisory signal from a previous stage optical transmission apparatus detected at the corresponding optical transmission apparatus on the pumping light corresponding to the pumping light superimposed with the supervisory signal, among the pumping lights of different wavelengths to be supplied to said Raman amplification medium.

15. (ONCE AMENDED) A Raman amplifier comprising:

a pumping light generating section [for generating] to generate a pumping light; and

a multiplexer [for supplying] to supply the pumping light from said pumping light generating section to a Raman amplification medium, [for] to Raman [amplifying] amplify a wavelength division multiplexed light being propagated through said Raman amplification medium,

wherein said Raman amplifier includes a supervisory signal superimposing section [for superimposing] to selectively superimpose a supervisory signal transferred among said plurality of optical transmission apparatuses [for transmitting] to transmit said wavelength division multiplexed light on the pumping light supplied to said Raman amplification medium from said pumping light generating section via said multiplexer,

wherein said Raman amplifier has a plurality of pumping light sources generating a plurality of pumping lights of different wavelengths, and

wherein said supervisory signal superimposing section selectively superimposes said supervisory signal on at least one of said plurality of pumping lights of different wavelengths supplied to said Raman amplification medium from said respective pumping light sources via said multiplexer.

17. A Raman amplifier according to claim [16] 15, wherein said Raman amplifier includes a suppression signal superimposing section for superimposing a suppression signal to suppress the supervisory signal from a previous stage optical transmission apparatus on the

pumping light corresponding to the pumping light superimposed with the supervisory signal from said previous stage optical transmission apparatus, among the pumping lights of different wavelengths to be supplied to said Raman amplification medium from said respective pumping light sources via said multiplexer.

Please add the following new claim:

19. (NEW) A method of Raman amplifying wavelength division multiplexed signal light, the method comprising:

providing wavelength division multiplexed signal light including a plurality of optical signals of different wavelengths through a transmission path;

supplying a plurality of pumping lights of different wavelengths to a Raman amplification medium existing on the optical transmission path to Raman amplify the wavelength division multiplexed signal light propagating through the Raman amplification medium; and

selectively superimposing a supervisory signal on at least one of said plurality of pumping lights.